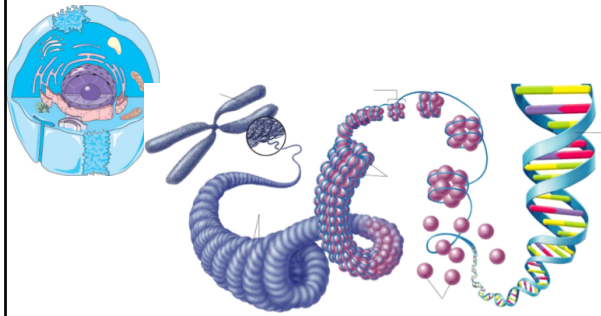


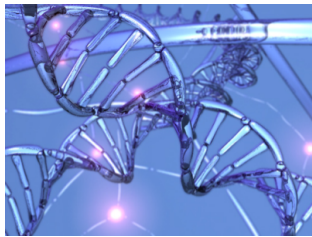
Structure of DNA

Nucleus - Chromosomes - Genes - DNA



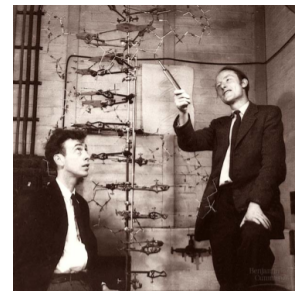
DNA (Deoxyribonucleic Acid)

Controls the production of proteins in the cell

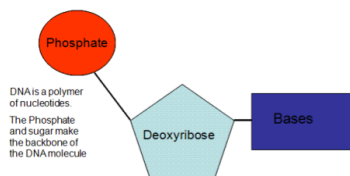


Watson and Crick

Shape of DNA
double helix
(2 strands twisted
together)

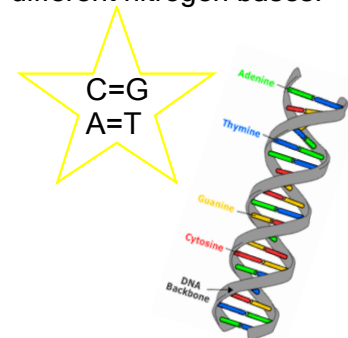


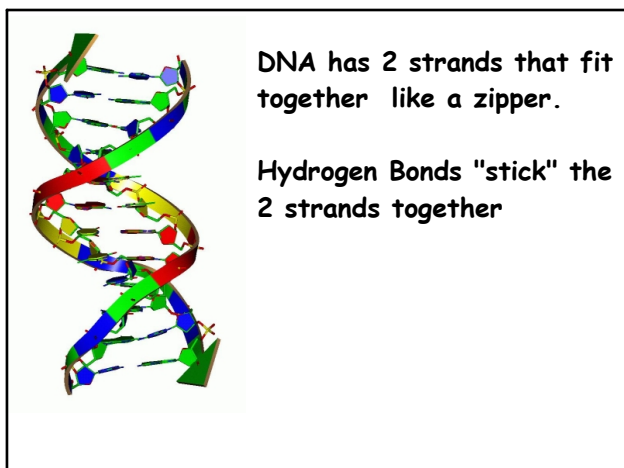
DNA is composed of nucleotides



DNA has four different nitrogen bases:

Cytosine **C**
Thymine **T**
Adenine **A**
Guanine **G**



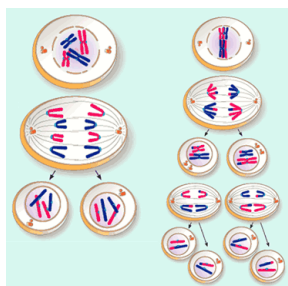


DNA Replication

when DNA copies itself



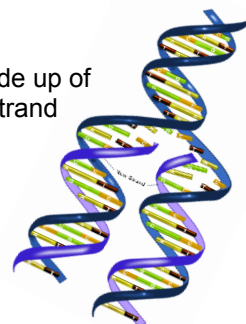
Replication occurs before mitosis and meiosis.



Why???

Semi-Conservative Replication

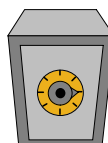
each piece of DNA is made up of 1 old strand and 1 new strand



Transcription

DNA - the master copy of directions a cell needs to make proteins

DNA in the nucleus is safe




DNA in the cytoplasm can be destroyed



RNA (ribonucleic acid)

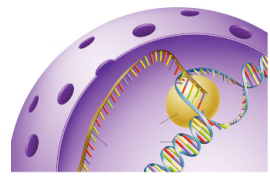
- copy of DNA that goes out into the cytoplasm
- tells the cell what to do



	DNA	RNA
How many strands?	2	1
Nucleotide subunit	<div>Phosphate Group</div> <div>Deoxyribose Sugar</div> <div>Nitrogen Base</div>	<div>Phosphate Group</div> <div>Ribose Sugar</div> <div>Nitrogen Base</div>
Bases	<div>Thymine (T)</div> <div>Adenine (A)</div> <div>Guanine (G)</div> <div>Cytosine (C)</div> <div>T - A</div> <div>G - C</div>	<div>Uracil (U)</div> <div>Adenine (A)</div> <div>Guanine (G)</div> <div>Cytosine (C)</div> <div>U - A</div> <div>G - C</div>

What is transcription?

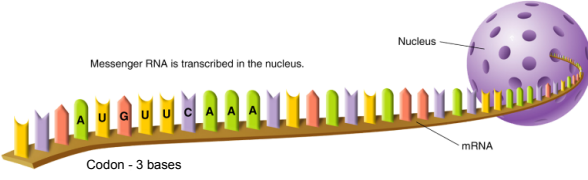
When RNA is made from 1 gene in DNA



The type of RNA made - mRNA (messenger RNA)
it sends a message from DNA to the cytoplasm

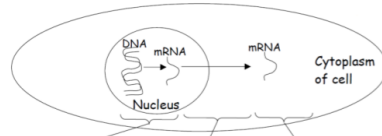
Steps in Transcription

1. Unzip one gene in DNA
2. Match up bases to one side of a gene in DNA
3. mRNA detaches from the DNA
4. mRNA moves out of the nucleus and into the cytoplasm



Translation

making the protein



Transcription happens in the nucleus. An RNA copy of a gene is made.

Then the mRNA that has been made moves out of the nucleus into the cytoplasm

Once in the cytoplasm, the mRNA is used to make a protein

How does mRNA tell the cell what to do?

mRNA is a message that codes for a protein

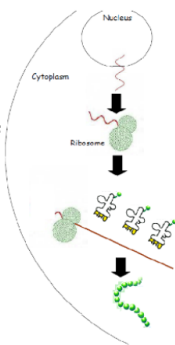
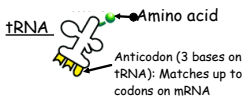
Proteins are made in the cytoplasm & then work to keep the cell alive

Translation (protein synthesis): Process of making a protein

There are 20 different types of amino acids

Process of Translation

- 1. mRNA moves out of nucleus and into cytoplasm
- 2. mRNA attaches to a ribosome
- 3. Transfer RNA (tRNA) decodes the mRNA & brings amino acids to build up the protein
- 4. Protein (chain of amino acids) detaches from ribosome & goes off to work in the cell



Different codons code for different amino acids!!!

		Second base				Third base
		U	C	A	G	
First base	U	UUU } Phenyl-alanine UUC } UUA } Leucine UUG }	UCU } Serine UCC } UCA } UCG }	UAU } Tyrosine UAC } UAA } Stop codon UAG }	UGU } Cysteine UGC } UGA } Stop codon UGG } Tryptophan	U
	C	CUU } Leucine CUC } CUA } CUG }	CCU } Proline CCC } CCA } CCG }	CAU } Histidine CAC } CAA } Glutamine CAG }	CGU } Arginine CGC } CGA } CGG }	C
	A	AUU } Isoleucine AUC } AUA } AUG } Methionine start codon	ACU } Threonine ACC } ACA } ACG }	AAU } Asparagine AAC } AAA } Lysine AAG }	AGU } Serine AGC } AGA } Arginine AGG }	A
	G	GUU } Valine GUC } GUA } GUG }	GCU } Alanine GCC } GCA } GCG }	GAU } Aspartic acid GAC } GAA } Glutamic acid GAG }	GGU } Glycine GGC } GGA } GGG }	G

ACU

ACAATGTAG

mRNA

Amino Acid -

		Second base				Third base
		U	C	A	G	
First base	U	UUU } Phenyl-alanine UUC } UUA } Leucine UUG }	UCU } Serine UCC } UCA } UCG }	UAU } Tyrosine UAC } UAA } Stop codon UAG }	UGU } Cysteine UGC } UGA } Stop codon UGG } Tryptophan	U
	C	CUU } Leucine CUC } CUA } CUG }	CCU } Proline CCC } CCA } CCG }	CAU } Histidine CAC } CAA } Glutamine CAG }	CGU } Arginine CGC } CGA } CGG }	C
	A	AUU } Isoleucine AUC } AUA } AUG } Methionine start codon	ACU } Threonine ACC } ACA } ACG }	AAU } Asparagine AAC } AAA } Lysine AAG }	AGU } Serine AGC } AGA } Arginine AGG }	A
	G	GUU } Valine GUC } GUA } GUG }	GCU } Alanine GCC } GCA } GCG }	GAU } Aspartic acid GAC } GAA } Glutamic acid GAG }	GGU } Glycine GGC } GGA } GGG }	G